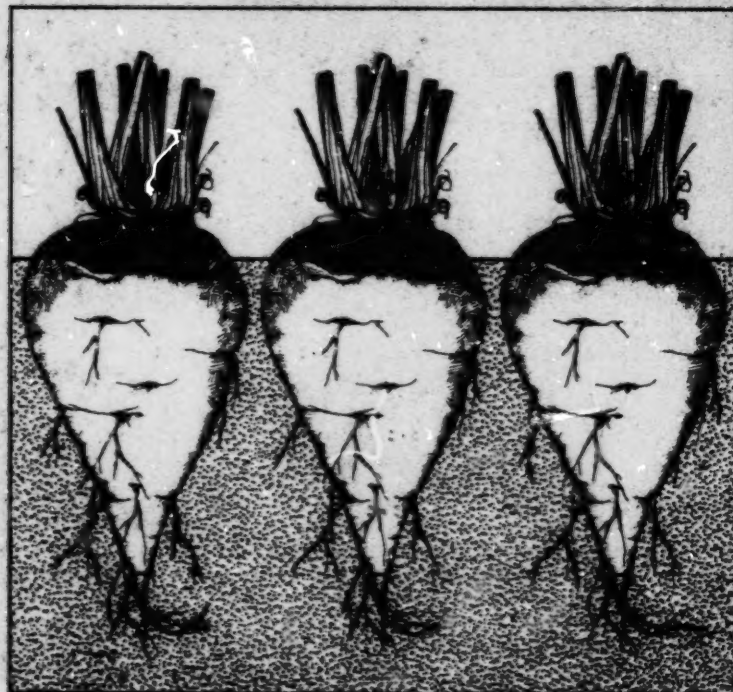


THE ECONOMICS OF



SUGAR BEET PRODUCTION — 1982

Agdex no.
171/821-4

Alberta
AGRICULTURE
Economic Services Division
Production Economics Branch

Copies of this publication may be obtained from:

Print Media Branch
Alberta Agriculture
7000 - 113 Street
Edmonton, Alberta, T6H 5T6
OR
Alberta Agriculture's district offices

THE ECONOMICS
OF
SUGAR BEET PRODUCTION
IN ALBERTA
1982

BY

LLOYD J. ANDRUCHOW
AGRICULTURAL ECONOMIST

&

REYNOLD N. JAIPAUL
RESEARCH ASSISTANT

PRODUCTION & RESOURCE ECONOMICS BRANCH
ECONOMIC SERVICES DIVISION
ALBERTA AGRICULTURE

FOREWORD

Sugar beets are one of the most important crops grown on irrigated farms in southern Alberta. Although this crop occupies only 15 per cent of the seeded acreage on irrigated farms, it contributes more than one-third of the total farm cash receipts. Given its importance, and because of grower concern for declining world sugar cane prices, rising production costs, net sugar beet farm cash receipts, the Alberta Sugar Beet Growers' Association asked the Production & Resource Economics Branch to undertake a three-year study of the economics of sugar beet production in Alberta.

This report shows that beet growers faced increasing losses in 1982. Yields were down 20.3 per cent from 1981 due to the poor weather conditions. Production costs fell 4.4 per cent from 1981 and beet prices were up 5.4 per cent. However, these positive effects were insufficient to offset the impact of reduced yields. Losses were 2.5 times greater than in 1981.

Dr. C. Ross, Head

Production & Resource Economics Branch

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to the Alberta Sugar Beet Growers' Association for their cooperation during the course of this study. Also, I wish to express my appreciation to the sugar beet growers for their cooperation in supplying us with the basic data.

Special acknowledgement is due to Mr. Ian Wood for his assistance in visiting the growers to familiarize them with the study and questionnaire and obtaining the necessary information required for the completion of this report. The Statistics Branch of Alberta Agriculture was very helpful in selecting a sample of growers for study.

Finally, thanks are due to the staff of the Production and Resource Economics Branch for their assistance in the preparation of this report.

LLOYD ANDRUCHOW
AGRICULTURAL ECONOMIST

TABLE OF CONTENTS

	<u>PAGE</u>
FOREWORD	i
ACKNOWLEDGEMENTS	ii
LIST OF TABLES	iv
LIST OF FIGURES	v
<u>SECTION</u>	
I. INTRODUCTION	
Objectives	2
Study Sample and Survey Method	2
Sugar Beet Production in Alberta	3
Description of Farm	6
Growing Conditions	6
Method of Analysis	7
II. SUMMARY OF COSTS AND RETURNS FOR THE STUDY SAMPLE	
Returns From Sugar Beet Sales	11
Direct Cash Expenses	12
Non-Cash Overhead	17
Summary of Costs and Returns	18
III. EFFECT OF SIZE OF OPERATION	
Returns From Sugar Beet Sales by Size of Operation	24
Cash Production Costs by Size of Operation	25
Non-Cash Production Costs by Size of Operation	27
Summary of Costs and Returns by Size of Operation	28
IV. EFFECT OF LOCATION	
Return From Sugar Beet Production by Location	30
Cash Production Costs by Location	32
Non-Cash Production Costs by Location	34
Summary of Costs and Returns by Location	35
V. COMPARISON OF COSTS AND RETURNS FOR 1981-82	
	36

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
1	Statistical Data on Sugar Beet Production in Alberta 1971-1982	4
2	Hauling Allowance Paid in 1982 For Beets Delivered to The Refinery	9
3	Summary of Sugar Beet Returns - 1982	11
4	Breakdown of Machine Operating Costs Associated With Sugar Beets - 1982	13
5	Summary of Material Input Costs Associated With Sugar Beet Production - 1982	14
6	Hired Labour Use and Total Cost For Sugar Beet Production - 1982	15
7	List of Custom/Contract Operations Associated With Sugar Beet Production - 1982	16
8	Summary of Cash Overhead Costs For The Average Sugar Beet Grower - 1982	17
9	Summary of Non-cash Overhead Costs For Sugar Beets - 1982	18
10	Summary of Costs and Returns - 1982 Group Average	19
11	Summary of Costs and Returns by Size of Operation - 1982	23
12	Summary of Material Input Costs by Farm Size - 1982	26
13	Summary of Cash Overhead Costs by Size of Sugar Beet Operation - 1982	27
14	Summary of Non-Cash Overhead Cost by Size of Sugar Beet Operation - 1982	28
15	Summary of Costs and Returns For Sugar Beet Production by Location - 1982	31
16	A Breakdown of Sugar Beet Cash Costs by Location - 1982	32
17	Summary of Non-Cash Production Costs For Sugar Beets by Location - 1982	34
18	Comparison of Costs and Returns For The 1981-1982 Study Years	38

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1	Map of Southern Alberta Showing The Loading Stations as Used For 1982 Sugar Beet Harvest	5
2	Percentage Breakdown of 1982 Sugar Beet Costs	21

SECTION I

INTRODUCTION

The survey regarding costs and returns for sugar beet production in southern Alberta was initiated in the spring of 1981 by the Production and Resource Economics Branch (P.R.E.B.) of the Alberta Department of Agriculture. At that time, the President of the Alberta Sugar Beet Growers' Association (A.S.B.G.A.) approached the P.R.E.B. and requested that an economic study of sugar beet production be undertaken. As the past twelve years have demonstrated production costs have been rising sharply and with the final price for sugar beets ranging from \$33.44^{*} per tonne in 1976 to \$74.05 per tonne in 1979, sugar beet growers are most interested in knowing about their actual financial performance.

In keeping with this request, the P.R.E.B. proceeded to conduct a study of three production years with 1981 being the initial study year. To ensure accurate interpretation and recording of the costs and returns associated with sugar beet production, it was necessary to monitor the sugar beet growers individually. This was made possible through the assistance of the Alberta Sugar Company who provided a 1980 list of sugar beet grower contracts. From this list, a total of 51 sugar beet growers were selected and were used as the basis for the 1981 study year. A report summarizing the 1981 findings of this study was published in June 1983.

A second survey of the 1982 production year was undertaken with 50 of the sugar beet growers participating. Like the previous survey participants provided detailed information regarding their 1982 sugar beet crop and it is from these contributions that the basis of this report was formulated.

* Price includes government subsidy

Objectives

The primary objective of this report is to provide the A.S.B.G.A., sugar beet growers, sugar refiners, extension personnel and the general public with factual cost of production information. It covers the second (1982) of three study years and reflects an average year of production in terms of yield per acre. This report was undertaken to:

1. Determine and document the production costs and returns associated with sugar beets;
2. Determine the physical input/output relationships in the production of sugar beets;
3. Assist sugar beet growers with farm budgeting and planning;
4. Show how variation in size of operation affects net returns;
5. Observe differences in the costs and returns for sugar beet production by location;
6. Study the effect of management practices on net returns;
7. To provide each participant with accurate and detailed costs and returns information regarding his sugar beet enterprise. As well, group averages are also provided to allow for comparison.
8. Provide an updated economic report on sugar beet production to assist in government policy formulation.

Study Sample and Survey Method

Sugar beet growers were randomly selected from a 1980 list of grower contracts provided by the Alberta Sugar Company. The selected sample comprising of sugar beet growers from the various areas where sugar beet is grown was directly proportional to the total number of sugar beet growers in those areas. Fifty of the 51 sugar beet growers initially selected for study were able to provide costs and returns data relative to the 1982 crop year for a complete economic analysis. As observed, most study participants held more than one sugar beet contract but were allowed to study only one. In 1982, the 50 contracts studied represented 8.2 percent of the total sugar beet acreage in southern Alberta.

Initially, each participant selected for the three-year study was personally contacted during the early summer of 1981. The content of the sugar beet questionnaire was fully explained with the major emphasis placed upon how he should relate his daily record keeping system to the information required for analysis. As the same participants are retained for each of the three study years only one visit during the winter following each harvest is required for questionnaire completion. Completed questionnaires are then analyzed by a computer program developed by the Systems Design Branch of Alberta Agriculture.

Sugar Beet Production in Alberta

Canadian Sugar Factories Ltd. began refining sugar in 1925 when they purchased a refinery built in 1903 by the Knight family. The factory was known as the Knight Sugar Factory and was located at Raymond. A second factory was constructed at Picture Butte in 1935 and was in operation until the end of the 1977 campaign. The throughput of the Picture Butte factory during the last year of operation was 2,283 tonnes per day. A third factory was built in Taber in 1950 and is the only plant in operation at present.

The factory at Taber was designed for a rated slice of 1,530 tonnes per day, but with systematic annual improvements the slicing capacity was increased to an average of 3,880 tonnes per day for the 1978, 1979, 1980 and 1981 production years. Generally speaking, the quality of sugar beets usually determine the slicing capacity. The 1980 campaign saw an initial slicing capacity of 3,840 tonnes per day due to deterioration in the quality of sugar beets in the pile. Slicing capacity for the 1981 campaign was a record 4,200 tonnes per day, requiring 190 slicing days to process the record yielding crop of 20.39 tonnes per acre.

With the 1982 acreage contract cut by 8.0 per cent and yields below the previous five-year average, total sugar beet tonnage produced in 1982 was the second lowest within the last decade. Slicing capacity at 4125 tonnes per day for the 1982 campaign was approximately 2.0 per cent less than that reported in 1981, and required a total of 111 slicing days to process the sugar beet crop.

The Agricultural Stabilization Board established a floor price for sugar beet in 1958 and since then deficiency payments have been paid for 14 years, ranging from \$0.89 per tonne to \$6.50 per tonne. The last deficiency payment was made in 1981 when total price including the subsidy was \$47.87 per tonne. A summary of sugar beet production in Alberta during the past twelve years is given in Table 1.

Table 1: STATISTICAL DATA ON SUGAR BEET PRODUCTION IN ALBERTA¹
1971-1982

Year	Contracted Acres	Harvested Acres	Total ⁴ Tonnage	Yield/ ² Planted Acre	Price/ Tonne
1971	43,610	42,045	620,956	14.79	21.05
1972	46,014	43,325	596,400	13.79	21.20
1973	43,018	38,204	526,466	13.80	51.81
1974	38,726	34,917	476,757	13.68	56.47
1975	45,986	39,535	443,066	11.22	40.02
1976	44,186	41,190	702,267	17.08	33.44 ³
1977	35,464	34,607	543,718	15.71	35.36 ³
1978	33,559	31,742	476,441	15.00	37.98
1979	33,793	31,794	499,734	15.72	74.05
1980	35,609	33,771	524,251	15.52	66.99
1981	35,405	35,071	715,082	20.39	47.87 ³
1982	32,161	30,502	474,866	15.57	45.51

1/ 58th Annual Report (1982), Alberta Sugar Beet Growers' Association; Lethbridge, Alberta.

2/ Tonnes per acre.

3/ Price includes Government subsidy.

4/ Tonnes

SOUTHERN REGION

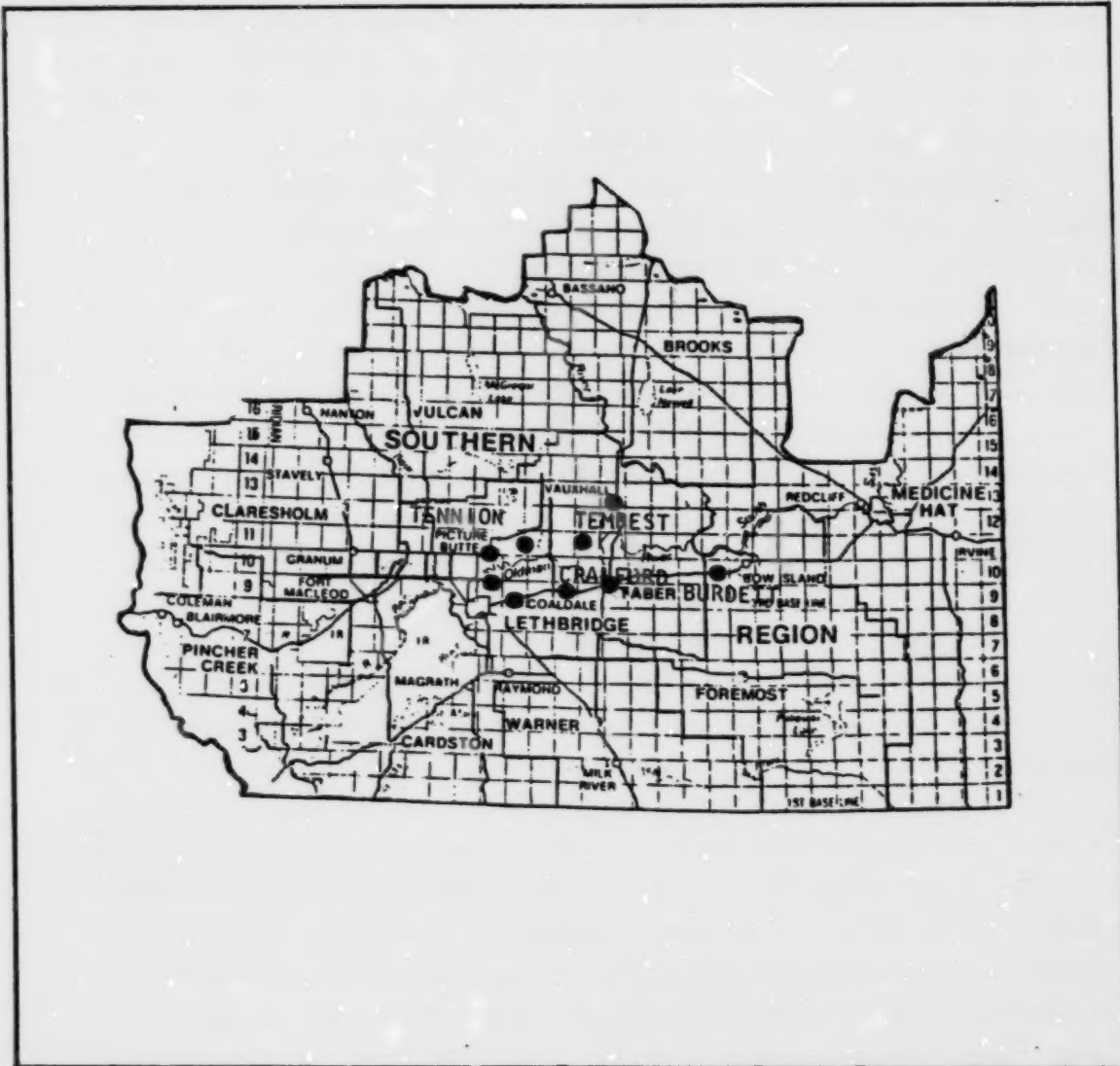


FIGURE 1: MAP OF SOUTHERN ALBERTA SHOWING THE LOADING STATIONS AS USED FOR 1982 SUGAR BEET HARVEST

Description of Farms

Average farming experience for the 50 study participants was 18.5 years. Similar to what was observed for the 1981 survey many of the participants who grew sugar beets, had in addition, a wide variety of other crops such as peas, corn, beans, wheat, etc. This wide diversity in crop type is a very common practice associated with irrigation farming, especially, in southern Alberta.

The typical farm on study had an average acreage of 534.2 acres. Of this, approximately 76.0 per cent or 406.2 acres was seeded. The remaining 24.0 per cent or 128.0 acres consisted of summerfallow and unseeded land. As was noted, the total acreage seeded to sugar beets for the average farm studied in 1982 was very small, representing only 15.4 per cent or 62.6 acres of the total cultivated acres. Despite its relatively small size, sales in 1982 from sugar beet production accounted for more than 33.0 per cent of the total farm income received for the average farm studied.

Growing Conditions

Unlike the harvest of 19.05 tonnes per acre in 1981, study participants experienced a rather disappointing yield of 15.18 tonnes per acre for the 1982 crop year. This decline in yield can be attributed to several factors, the key element of which was that of adverse weather.

To begin with, one of the worst thunderstorms to hit southern Alberta occurred on May 25, 1982, namely in the areas of Picture Butte, Coaldale, Tempest and Raymond. The aftermath of which resulted in the replanting of 4,146 acres or 13.0 per cent of the total cropped sugar beet acres. As previous studies have suggested, there tend to exist a direct relationship between the time of planting and sugar beet yield. To qualify further, the later the time of planting the lower are the yields. Therefore, by having to re-plant some of the cropped acres, this delay in planting time has had the net effect of reducing somewhat the sugar beet yield as observed.

Secondly, two hailstorms, notably on July 1, 1982 and July 25, 1982 were also contributory factors to a lower yield. As a consequence of these two storms, a total loss of 1,331 acres or 4.2 per cent was suffered by sugar beet growers.

Other problems experienced by the sugar beet growers were the higher incidence of root maggots, flea beetles, wire worm, etc. as well as some weedicide damage, humidity and soil crusting. From the foregoing, one sees that the 1982 crop year was one that was most frustrating for the typical sugar beet grower.

Method of Analysis

The reader should be aware that all of the information presented with respect to the various costs and returns are based on planted acres. Costs as shown in the summary tables are expressed on a "per acre basis" and are the result of dividing the sum of all expenses by the total planted acres. For some specific cases certain cost items were not incurred in an individual operation and were accounted for in the method used in the determination of cost on a per acre or a per tonne sold basis. For the reader's benefit an attempt has been made to explain and elaborate on a few of the terms as used within this report.

Returns: This represents the income that was received from the sugar beet crop. Returns were from three major sources, namely:

1. Actual sugar beet sales;
2. Hauling allowances received;
3. Sale of sugar beet tops.

At the time of data analysis of the 1982 sugar beet crop, an estimated price of \$46.00 per tonne was used as suggested by the Alberta Sugar Company. Since then, this price has been adjusted somewhat resulting in a lower final price of \$45.51 per tonne. As such, the information presented in the following tables was adjusted to reflect the actual returns.

A value was assigned to sugar beet tops only by those study participants utilizing same for livestock feeding. The value of the sugar beet top was totally dependent upon top growth. As the study showed, a few

producers indicated the utilization of sugar beet tops since the general trend has been towards increasing use of the sugar beet defoliator, resulting in much of the crop residue being incorporated into the soil. The average value of sugar beet tops for the study sample was \$6.45 per acre or \$0.42 per tonne of sugar beets produced.

Additional income was realized by some of the study participants through the incorporation of hauling allowances. This benefit was solely dependent upon the hauling distance to the Taber factory. Presented on the next page is Table 2 showing the hauling allowance schedule for sugar beets delivered to the Taber factory. Unlike the 1981 study year, hauling allowances for the Raymond growers were discontinued in 1982. On the average, the typical study participant realized an income of \$5.22 per acre or \$0.34 per tonne for the total sugar beet tonnage hauled.

Labour: Only a few of the sugar beet growers were able to perform all of the necessary farming operations without the utilization of hired labour. Hired labour was predominantly used on a contractual basis for the thinning, weeding and hoeing operations. For hired labour that was not contracted the value assigned was representative of the actual amount paid. The majority of growers on study utilized hired wage labour during the harvesting operation especially for the hauling of sugar beets to the various loading stations. In 1982, the average sugar beet grower studied utilized a total of 109.84 hours of hired labour for the 48.72 acres planted. On an hourly basis, this amounted to 2.25 hours per acre with an average value of \$6.34 per hour. Operator's labour was valued between \$6.75 and \$7.00 per hour.

Machine Costs: Each study participant was asked to provide a detailed inventory of all equipment and their total hours used in the production of the sugar beet crop. Having obtained this information, total operating and ownership costs for each machine was calculated. To facilitate computation of machinery costs and depreciation, the publication "Farm Machinery Costs - 1982, Agdex 825-12" was consulted in which detailed costs for each machine type is given on an hourly basis. What should be remembered is that the hourly costs as presented in this publication are most current and takes into account such factors as replacement costs, interest, insurance, housing, fuel, lubrication and

TABLE 2: HAULING ALLOWANCE PAID IN 1982 FOR SUGAR BEETS DELIVERED
TO THE TABER REFINERY

<u>Distance</u>	<u>Hauling Allowance</u>		<u>Distance</u>
<u>Hauling Allowance</u>			
(miles)	\$/tonne	(miles)	\$/tonne
0- 5.9	FREE ZONE	18-18.9	1.11
6- 6.9	0.18	19-19.9	1.17
7- 7.9	0.29	20-20.9	1.23
8- 8.9	0.41	21-21.9	1.30
9- 9.9	0.52	22-22.9	1.36
10-10.9	0.61	23-23.9	1.42
11-11.9	0.68	24-24.9	1.48
12-12.9	0.75	25-25.9	1.54
13-13.9	0.81	26-26.9	1.60
14-14.9	0.87	27-27.9	1.67
15-15.9	0.93	28-28.9	1.73
16-16.9	0.99	29-29.9	1.79
17-17.9	1.05	over 30	1.85

repairs. For those operations involving custom work no machinery costs were assigned. Rather, these were costed at the actual amounts paid by the sugar beet growers and show up in the cost table as a cash cost.

Materials: Most supplies such as seed, fertilizers, herbicides, etc., were bought through the Alberta Sugar Company and were thus valued at their actual cost. It should be added that some of the study participants indicated the use of barnyard manure on their sugar beet land. For such cases the cost of the manure itself was not determined. Instead, the cost of manure spreading was allocated towards the 1982 sugar beet crop. It is a recognizeable fact that such manure applications will have a significant effect on subsequent crop yields.

Cash Overhead: The major cash items included under the heading of cash overhead were crop insurance, association fees, land and water taxes, building and equipment insurance, utilities and miscellaneous. As these costs are basically fixed annual charges they were recorded at the actual dollar value paid. Association fees remained unchanged from the previous study year - 1981, at fifteen cents per tonne and were deducted from the November 6, 1982 and December 6, 1982 initial payments. Included as well under cash overhead was interest on operating capital, the amount of which was determined by applying an interest rate of 14.0 per cent on all cash costs for a six month period.

Real Estate: The valuation of land associated with sugar beet production was done by the study participant themselves. Their basic criteria for land evaluation was the utilization of the market value of similar land in their area. Realizing an inflationary return on land of approximately 5.0 per cent, interest on land investment was calculated using 7.0 per cent. For those study participants who cash rented or crop shared land the actual cash paid or crop (valued at \$45.51 per tonne) was used to reflect their land cost.

Study participants also provided a listing of all buildings and other permanent facilities such as roads, ditches, natural gas lines, etc. associated with the sugar beet operation. The age, market value and percentage of use were also given and were used in the calculation of depreciation and interest costs. The interest rate used in assessing the opportunity cost on money invested in buildings and other permanent facilities was 12.0 per cent for a six month period.

SECTION II

SUMMARY OF COSTS AND RETURNS FOR THE STUDY SAMPLE

Sugar beet production showed a significant decline in the 1982 crop year when compared to 1981. Average production of sugar beets in 1982 was 739.71 net tonnes (794.79 gross tonnes), a decline of 25.5 per cent from the 1981 production levels. With sugar beet yields varying from 5.41 tonnes to 24.8 tonnes per acre, study participants experienced a considerable range in returns. Gross income resulting from the sale of sugar beets for the average sugar beet grower studied was \$690.97 per acre or \$45.51 per tonne. (Table 3)

Table 3: SUMMARY OF SUGAR BEET RETURNS - 1982

	\$/Acre	\$/Tonne
Sugar Beet Sales	690.97	45.51
Value of Sugar Beet Tops	6.45	0.42
Hauling Allowance	5.22	0.34
TOTAL ESTIMATED INCOME	702.64	46.27

Apart from income realized through the direct sale of sugar beets, some study participants indicated additional income from the sale of sugar beet tops that were utilized in livestock feeding. These additional returns ranged from \$10.00 per acre to \$50.00 per acre, the average of which was \$25.35 per acre for the 8 farms reporting a value. When weighted on a total group basis, the average return from sugar beet tops amounted to \$6.45 per acre or \$0.42 per tonne.

Another source of income was from the hauling of sugar beets. Sugar beet growers who hauled their sugar beets to the Taber refinery were compensated directly in the form of hauling allowances when the distance

hauled exceeded 5.9 miles. Of the 50 sugar beet growers analyzed, only 7 or 14.0 per cent received a hauling allowance. For those growers who did receive a hauling allowance, a wide variation was noted ranging from \$2.41 per acre to \$33.64 per acre. When considered on a group basis, total hauling allowance amounted to \$5.22 per acre or \$0.34 per tonne. Unlike the previous production year of 1981, hauling allowances that were initially awarded to the Raymond growers were discontinued in 1982.

Direct Cash Expenses

All of the cost information presented in this report are based on planted acres. The various costs as presented in the summary tables are not simple averages but rather are weighted and expressed on a per acre basis. The reader should be aware that for any kind of enterprise to be economically viable its returns must exceed its operating costs. Failure to achieve this will result in the failure of that enterprise. In evaluating the direct cash expenses that were associated with the sugar beet enterprise five major costs were considered, each of which is described to some detail in the following paragraphs.

Machine Operating Costs: Machine operating costs still remains to be the highest cash cost facing sugar beet growers. For example, in the 1982 study, expenditures in machinery fuel and repairs for the average sugar beet grower with 48.72 planted acres amounted to \$7,826.25 or \$160.63 per acre. This, when expressed as a percentage of the total cash costs accounted for 34.3 per cent.

The method used in the determination of machinery fuel and repair costs was very straight forward. It involved the application of an hourly rate for machinery fuel and repairs (see Farm Machinery Costs - 1982, Agdex 825-12), to the total number of hours a specific machine was used in the sugar beet operation. The subsequent totals for each type of machine engaged in sugar beet production were then added and divided by the total planted acres to arrive at the average cost per acre.

A breakdown of machine operating costs for the average sugar beet grower studied during the pre-season, seeding, summer and harvesting operations is given in Table 4.

Table 4: BREAKDOWN OF MACHINE OPERATING COSTS ASSOCIATED WITH
SUGAR BEETS - 1982

Operation	Fuel and Repair Costs (\$)	Fuel & Repair Costs per Acre(\$)	Percent of Total
Pre-Seeding	1,626.97	33.39	20.8
Seeding	277.25	5.69	3.5
Summer	1,696.05	34.81	21.7
Harvesting	4,225.96	86.74	54.0
TOTAL	7,826.25	160.63	100.0

Machine operating costs for the pre-season operation included the cost of all of the farming operations performed on the land immediately after the previous crop was harvested. For sugar beets grown on previously summerfallowed land, the cost of the summerfallow operations was included as well. The seeding operation as the name implies represented the machine costs associated with the planting of the sugar beet crop. Machine operating costs reported for the summer operations consisted mainly of row cultivation and irrigation costs. As observed, the highest of the machine operating costs occurred during the harvesting operations. That is, harvesting costs at \$86.74 per acre accounted for 54.0 per cent of the total machine operating costs. The main harvesting operations included topping/defoliating, digging, and hauling, each of which required the use of highly specialized equipment.

Material Costs: Material costs for the average contract studied totalled \$133.75 per acre. When this amount is expressed as a percentage of the total cash costs it accounted for 28.6 per cent and was thus the second most significant cash cost. An attempt has been made to determine the average cost of the basic inputs comprising material costs and are shown in Table 5.

Table 5: SUMMARY OF MATERIAL INPUT COSTS ASSOCIATED WITH SUGAR BEET PRODUCTION - 1982

Material Input	Frequency	Average Cost per Acre (\$)	Range in Costs (\$/Acre)
Seed	50	21.25	5.40 - 48.50
Fertilizers	50	74.96	18.42 - 114.95
Herbicides	48	35.71	5.13 - 104.63
Insecticides	13	1.84	5.15 - 11.84
TOTAL		113.75	

For the 50 sugar beet growers studied, the range in total input cost was quite large varying from a low of \$47.48 to \$209.67 per acre.

Hired Labour and Custom Contract Work: Another fairly significant cash cost was that of hired labour and custom/contract work. When combined, these two items totalled \$74.26 per acre or represented 15.9 per cent of the total cash costs. As the previous report had indicated, high labour requirements still remain to be the biggest challenge facing sugar beet growers and this is even compounded further by the fact that the labour demand by such an enterprise is quite seasonal.

In an attempt to meet this challenge a noticeable decline in hired labour cost by approximately 50.0 per cent was noted for the 1982 crop year. That is, hired wage labour totalled 109.84 hours or 2.25 hours per acre as compared to 218.1 hours or 4.21 hours per acre reported in 1981. One possible explanation for this is that sugar beet growers are becoming more cost conscious in the face of rising labour costs and have therefore been adopting better management practices such as herbicide incorporation, mechanical thinning and space planting. An indication as to the rate per hour charged and the distribution of the total hours used for the various sugar beet activities are presented in Table 6.

Table 6: HIRED LABOUR USE AND TOTAL COST FOR SUGAR BEET
PRODUCTION - 1982

Operation	Hired Labour Hours	Hourly Rate (\$)	Total Costs (\$)
Pre-Season	9.98	5.71	57.02
Seeding	2.60	5.85	15.20
Summer	7.47	6.01	44.36
Harvest	89.79	6.45	578.91
TOTAL	109.84		696.00

For the typical sugar beet grower a total of \$696.00 was spent or \$14.29 per acre for hired labour. On an hourly basis this cost amounted to \$6.34 per hour.

Listed in Table 7 are the most common custom contract operations performed in 1982, their frequencies and their average cost per acre. The average study participant spent a total of \$2921.92 or \$59.97 per acre for custom/contract work.

Cash Rent/Crop Share: Twelve or 24.0 per cent of the study participants had either cash rent or crop share arrangements for the sugar beet acres under study. Whenever the total cost of the cash lease was given, this was interpreted as a cash cost and in many cases represented a lump sum payment for a quarter section of land. For such instances, only a fraction of this payment was allocated to the sugar beet enterprise.

Where the tenant agreed to pay the landlord a portion of the sugar beet crop, the actual cost for such a crop share arrangement was determined by valuing the landlord's tonnage at \$45.51 per tonne.

The average cost for the 12 sugar beet growers with crop share/cash rent arrangements amounted to \$120.55 per acre. This cost when expressed on a total group basis was \$25.01 per acre.

Table 7: LIST OF CUSTOM/CONTRACT OPERATIONS ASSOCIATED WITH
SUGAR BEET PRODUCTION - 1982

Operation	Frequency	Cost Per Acre (\$)
Weeding	19	36.62
Thinning	3	42.31
Hoeing	1	30.00
Thinning - Weeding	22	52.29
Weed - Thin - Hoe	5	33.52
Fertilizer Spreading	15	2.72
Spraying	8	6.01
Manuring	2	16.56
Hauling Sugar Beets	13	32.26

Cash Overhead: For any given enterprise there exist "certain" cash costs that cannot be divorced from other enterprises. These "certain" costs are what is often referred to as cash overhead costs and for the purpose of this study included crop insurance, association fees, land and water taxes, building and equipment insurance, utilities and miscellaneous. Shown in Table 8 are these costs and their corresponding totals.

As observed in 1982, only 6 or 12.0 per cent of the sugar beet growers studied exercised the option of acquiring crop insurance. For those who did a wide variation in cost was observed ranging from \$3.00 per acre to \$10.00 per acre. Total crop insurance when expressed for the entire group was \$32.53 or \$0.67 per acre.

Association fees were paid by all of the sugar beet growers and were deducted at the time of the initial sugar beet payment. For the group studied association fees averaged \$2.22 per acre. Like association fees, land and water taxes represent fixed annual charges and were paid by all sugar beet growers owning land. Average cost per acre for land and water tax for the study group were \$3.51 and \$9.56, respectively. For those sugar beet growers with crop cash/share rent arrangements no land or

Table 8: SUMMARY OF CASH OVERHEAD COSTS FOR THE AVERAGE SUGAR BEET GROWER - 1982

Cash Overhead	Total Cost (\$)	Cost Per Acre (\$)
Crop Insurance	32.53	0.67
Association Fees	108.00	2.22
Land Tax	171.24	3.51
Water Tax	465.87	9.56
Building & Equipment Insurance	396.76	8.14
Utilities	345.45	7.09
Miscellaneous Overhead	613.16	12.58
Interest on Operating Capital	1491.89	30.62
TOTAL CASH OVERHEAD	3,624.90	74.41

water tax was paid. Due to the nature of items such as building and equipment insurance and utilities which represent "lump sum" costs for the total farm, it was necessary for the study participants themselves to allocate only a portion of these cost to their sugar beet enterprises. Interest on operating capital for the 1982 study year was calculated using an interest rate of 14.0 per cent for a six month period.

Non-Cash Overhead: Each participant on study indicated the market value of owned land so that an opportunity cost could be calculated for sugar beets grown on such land. The land values obtained were quite variable and ranged from \$1,000.00 per acre to \$2,000.00 per acre. Realizing an inflationary return on land of approximately 5.0 per cent, interest on land investment (that is, opportunity cost) was calculated using 7.0 per cent. For the average sugar beet grower studied the opportunity cost associated with land valued at \$1,703.95 per acre was \$4,622.53 or \$94.88 per acre.

Depreciation and interest costs were determined for only those buildings and improvements that were involved with sugar beet production. Depreciation on buildings was calculated by taking a percentage of the

market value that was appropriate to the sugar beet enterprise, subtracting an assumed salvage value of 10.0 per cent and dividing by the estimated number of years of useful life remaining. Under the title of buildings were included a portion of the operator's house, sugar beet labour houses, machine sheds and garages. For each of these items study participants indicated the percentage of use that would apply to the sugar beet operation.

Improvements included non-depreciable assets such as gas lines, roads and ditches. For such assets only an opportunity interest cost was determined. In 1982, the average sugar beet grower studied indicated a total market value of \$17,369.20 for buildings and improvements which when expressed on a per acre basis amounted to \$356.51.

The primary source of labour for sugar beet activities came from the operator himself. To illustrate, approximately 567.34 man hours or 83.8 per cent of the total man hours was supplied by the operator while 109.84 man hours or 16.2 per cent was hired. For the purpose of this study all of the operator's labour was valued at \$7.00 per hour. On a per acre basis, operator's labour in 1982 averaged \$81.46 for the 11.64 hours spent. A summary of the non-cash overhead costs associated with sugar beet production is shown in Table 9.

Table 9: SUMMARY OF NON-CASH OVERHEAD COSTS FOR SUGAR BEETS - 1982

Item	\$/Acre
Operator's Labour	81.46
Machinery Interest & Deprec	175.62
Bldg & Equip Interest & Deprec	33.27
Land Interest (7.0%)	94.88
TOTAL	385.23

Summary of Costs and Returns: Presented in Table 10 is a summary of costs and returns for the average sugar beet grower analyzed in the 1982 sugar beet production year.

Table 10: SUMMARY OF COSTS AND RETURNS - 1982 GROUP AVERAGE

	Group Average \$/acre	Group Average (\$/tonne)	Percent of total
RETURNS			
Sugar Beet Sales	690.97	45.51	98.36
Sugar Beet Top Value	6.45	0.42	0.91
Hauling Allowance	5.22	0.34	0.73
TOTAL RETURNS	702.64	46.27	100.00
CASH COSTS			
Machine Operation	160.63	10.58	18.83
Materials	133.75	8.81	15.67
Custom/Contract Work	59.97	3.95	7.03
Cash Rent/Crop Share	25.01	1.65	2.93
Hired Wage Labour	14.29	0.94	1.67
Cash Overhead	74.41	4.90	8.72
TOTAL CASH COSTS	468.06	30.83	54.85
NON-CASH COSTS			
Land	94.88	6.25	11.12
Building Ownership	33.27	2.19	3.90
Machinery Ownership	175.62	11.57	20.58
Operator's Wage Labour	81.46	5.37	9.55
TOTAL NON-CASH COSTS	385.23	25.38	45.15
TOTAL PRODUCTION COSTS	853.28	56.20	100.00
RETURN OVER CASH COSTS (\$/Ac)	234.58	15.44	
RETURN TO MANAGEMENT (\$/Ac)	-150.64	-9.93	
BREAKEVEN PRICE TO COVER			
CASH COSTS (\$/tonne)	30.83	-	
BREAKEVEN PRICE TO COVER			
ALL COSTS (\$/tonne)	56.21	-	

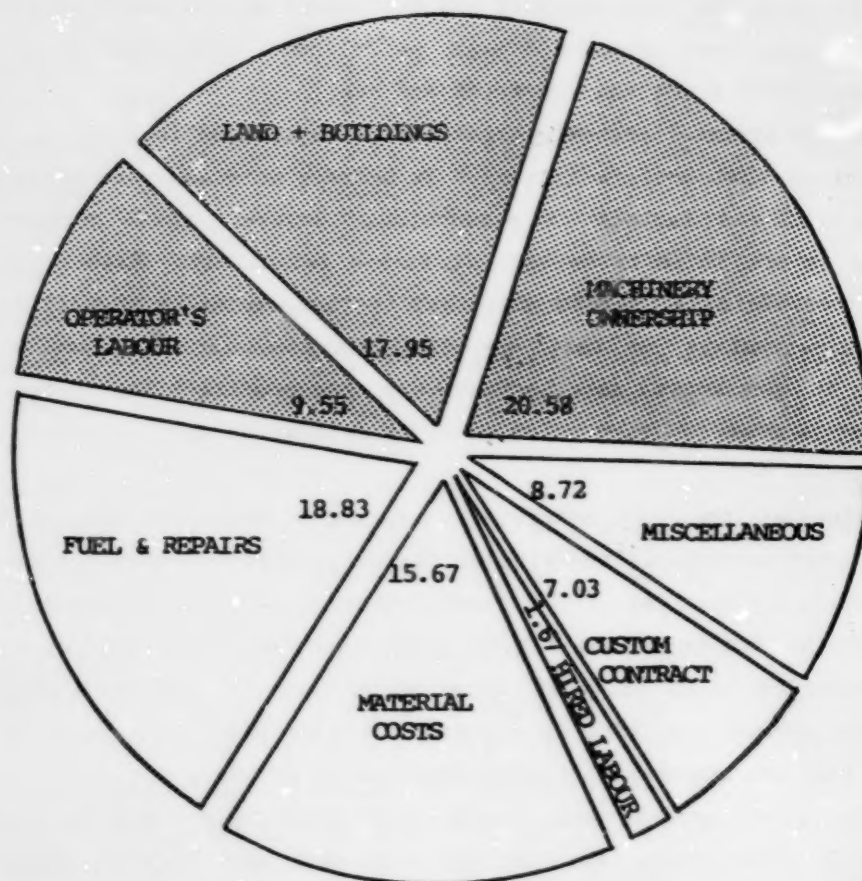
As Table 10 reveals, sugar beet growers experienced a more negative return to management of \$150.64 per acre in 1982 compared to the negative return to management of \$59.45 per acre in 1981. One reason for this has been the significant decline in yield to 15.18 tonnes per acre in 1982 compared to 19.05 tonnes per acre reported in 1981.

Total production costs for the 1982 crop year amounted to \$853.28 per acre or \$56.20 per tonne. Of this total, cash costs amounted to \$468.06 per acre (\$30.83 per tonne) or accounted for 54.9 per cent. What still remains to be the most significant of cash costs facing sugar beet growers is that of machine operating costs. For the group studied machine operating costs were \$160.63 per acre (\$10.58 per tonne) or 34.3 per cent of the total cash costs. This was followed by material inputs, namely seed, fertilizer and chemicals at \$133.75 per acre (\$8.81 per tonne). Machinery operating costs when combined with machinery ownership totalled \$336.25 per acre. This when expressed as a percentage of the total production cost was quite significant at 39.4 per cent.

Presented in Figure 2, is a pie graph showing in some detail the percentage breakdown of the costs associated with sugar beet production in 1982.

FIGURE: 2

PERCENTAGE BREAKDOWN OF 1982 SUGAR BEET COSTS



 Non-Cash Costs

SECTION III

EFFECT OF SIZE OF OPERATION

In an attempt to evaluate whether the size of an operation had any effect on net returns study participants were divided into four size categories. Size for each category was determined on the basis of number of planted sugar beet acres and were as follows: less than 40 acres; 40-69 acres; 70-99 acres and 100 acres and over.

A very fundamental economic principle of any production unit is that as the size of that unit is increased it becomes more and more efficient in the use of its factors of production. However, this increase in efficiency is not infinite as size increases infinitely. Rather, there exists a 'certain size' beyond which any further expansion results in an economic disadvantage in that due to limitations of the factors of production the production unit becomes very uneconomical. This situation if attained is what is often referred to by economists as diseconomies of scale.

In view of the aforementioned, one would therefore expect some degree of cost savings as the size of the sugar beet enterprise increases. For example, cost per acre for specialized sugar beet equipment will decline as the number of sugar beet acres increase. In other words, a larger number of acres provides for a wider base over which a certain cost can be spread resulting in a lower cost per acre as opposed to if that very cost was expressed on a smaller number of acres.

Similarly, by growing sugar beets on a large scale would invariably reflect a greater demand for inputs, equipment etc. Where the cost savings come into play is in the use of techniques such as 'bulk buying' whereby because of the large demand for inputs, etc. the unit price charged is lower compared to if that same input was bought in smaller volumes. Also, by operating on a large scale more efficient use is made of labour and management, thus, a further reduction in costs.

The previous two paragraphs are only examples of some of the types of costs savings that can be realized on larger farms as compared to smaller farms. It should be stressed that the effect of such reductions

TABLE 11: SUMMARY OF COSTS AND RETURNS BY SIZE OF OPERATION - 1982

	<u>GROUP AVERAGE</u>	<u>LESS THAN 40 ACRES</u>	<u>40-69 ACRES</u>	<u>70-99 ACRES</u>	<u>100 ACRES AND OVER</u>
NUMBER OF FARMS	50	18	12	11	9
AVERAGE YIELD (t/Ac)	15.18	14.57	15.15	15.75	15.03
RETURNS	- - - - - \$ PER ACRE - - - - -				
Sugar Beet Sales	690.47	663.08	689.48	716.78	684.02
Sugar Beet Tops	6.45	12.53	4.70	7.56	2.46
Hauling Allowance	5.22	1.31	10.45	2.21	7.23
TOTAL RETURNS	702.64	676.92	704.63	726.55	693.71
CASH COSTS					
Machine Operation	160.63	183.70	153.89	180.19	130.45
Materials	133.75	122.90	143.49	129.42	138.49
Custom/Contract Work	59.97	60.11	48.81	53.25	74.41
Cash Rent/Crop Share	25.01	15.58	8.05	33.54	34.42
Hired Wage Labour	14.29	7.62	13.25	10.11	23.60
Cash Overhead	74.41	85.97	80.43	67.99	69.05
TOTAL CASH COSTS	468.06	475.88	447.92	474.51	470.42
NON-CASH COSTS					
Land	94.88	95.26	105.66	97.58	84.41
Building Ownership	33.27	45.51	39.35	28.77	25.53
Machinery Ownership	175.62	208.54	165.22	191.62	145.11
Operator's Wage Labour	81.46	123.03	89.46	81.91	48.14
TOTAL NON-CASH COSTS	385.23	472.34	399.69	399.88	303.19
TOTAL PRODUCTION COSTS	853.28	948.23	847.60	874.38	773.59
RETURN OVER CASH COSTS	234.58	201.04	256.71	252.04	223.29
RETURN TO MANAGEMENT	-150.64	-271.31	-142.97	-147.83	-79.88
BREAKEVEN YIELD TO COVER CASH COSTS (t/Ac)	10.11	10.24	9.63	10.29	10.19
BREAKEVEN YIELD TO COVER ALL COSTS (t/Ac)	18.43	20.41	18.22	18.95	16.76

results in a relatively lower production cost structure, hence yielding greater returns to management.

Returns From Sugar Beet Production By Size of Operation

Presented in Table 11 are the costs and returns associated with sugar beet production for the four size groups analyzed. As observed there seemed to exist a relationship between sugar beet yields (hence returns) and size. To elaborate, the two groups farming less than 70 acres of sugar beets averaged 14.86 tonnes per acre whereas the other two size groups planting 70 acres or more reported a much higher yield averaging 15.39 tonnes per acre. As well, it was noted that the smaller sugar beet growers were much more inclined to utilize sugar beet tops as compared to their larger counterparts. For example, the total value of sugar beet tops for the farms having less than 70.0 acres of sugar beets was \$8.61 per acre versus \$5.01 per acre reported by the larger sugar beet farms. One possible explanation for the lower value reported by the larger growers is that larger farms are much more inclined to use defoliators in their harvesting operations, resulting in much of the crop residue being incorporated into the soil.

Another observation seems to suggest that hauling allowances increased with increasing size of operation. The argument here being that the larger sugar beet growers with larger trucks are in a much more able and better position to haul their sugar beets directly to the Taber factory. The range in hauling allowance on a size basis varied from \$1.31 for farms growing less than 40 acres of sugar beets to \$7.23 for farms growing 100 acres or more. For the group planting 40-69 acres of sugar beets, their hauling allowance was \$10.45 per acre.

The range in total returns varied from \$676.92 per acre for the farms planting less than 40 acres of sugar beets to a high of \$726.55 per acre for those planting 70-99 acres. For the group of sugar beet growers planting 100 acres or more, their total returns were somewhat lower at \$693.71 per acre as their yield was down 5.0 per cent when compared to the group planting 70-99 acres.

Cash Production Costs By Size of Operation

Referring back to Table 11 reveals that economies of scale did exist as the size of the sugar beet operation was increased. More noticeably so were the cost savings realized in the area of labour. As shown in the table, total labour cost (includes both hired and owned) showed a steady decline as the total sugar beet acres increased. That is, total labour cost for farms growing less than 40 acres of sugar beets was \$130.65 per acre and represented the highest cost for the entire group of sugar beet growers studied. On the other hand, farms cultivating 100 acres or more of sugar beets reported the lowest labour cost of \$71.74 per acre - a decrease of approximately 45.0 per cent between the two size groups. One reason for this is that as farm size increases there is an associated increase in labour demand. To offset this increase in demand and by reason of economics many sugar beet growers are forced into a situation of substitution whereby increase useage of machinery is made to replace hired labour. In addition, larger farms are better able to more innovative practices such as chemical weed control and mechanical thinning thereby reducing labour cost.

When machine operating costs are examined these were found to be the highest for the group cultivating less than 40 acres of sugar beets at \$183.70 per acre. For the group having 100 acres or more of sugar beets, their machine operating cost was the lowest at \$130.45 per acre. Machine ownership costs were \$208.54 per acre for those study participants having fewer than 40 acres of sugar beets while those with 100 acres or more had machine ownership costs of \$145.11. Essentially, by spreading out the fixed cost of machine ownership over more acres along with the lower time requirements for larger farms with large equipment accounted for the lower machine cost as observed.

A few points are worth noting when material input costs are considered (See Table 12). Overall, farms having less than 40 acres of sugar beets had the lowest material input cost. Cost for these farms was significantly low especially for fertilizer at \$62.28 per acre. In terms of seeding costs, these farms had the second lowest cost at \$20.38 per acre when compared to the other three size groups. It should be mentioned that while lower input costs might seem quite desirable as these

TABLE 12: SUMMARY OF MATERIAL INPUT COSTS BY FARM SIZE - 1982

	<40	40-49	70-99	100 Acres
	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>And Over</u>
	- - - - - \$/Acre - - - - -			
Yield (t/Ac)	14.57	15.15	15.75	15.03
Seed	20.38	18.04	22.96	22.35
Fertilizer	62.28	80.51	71.66	82.76
Chemicals	40.24	44.94	34.81	33.38
TOTAL	122.90	143.49	129.43	138.49

smaller farms (<40 acres) have demonstrated, these farms also had the lowest yield. Thus, as the results might suggest there seems to exist a trade off between input use (as affected by cost) and yield. How best inputs ought to be used is totally dependent upon the grower's management ability and finances, prices, etc.

Consistent with what was reported in the 1981 study year, participants in 1982 with 40-69 cultivated acres reported the highest material costs at \$143.49 per acre. One would have expected for example, that fertilizer expenditures per acre would have declined moderately as farm size increased, not due to a different application rate but rather to the advantages of bulk buying, etc. However, chemical costs would be expected to increase as the scale of the operation increased. The rationale for this being that of a matter of substitution whereby as the operation gets larger in an attempt to reduce labour demands more use of chemicals would be incorporated.

In general, total cash overhead costs (Table 13) declined with increasing farm size from \$85.97 per acre to \$69.05 per acre for the smallest (<40 acres) and largest (100 acres or more) sugar beet operations, respectively. This decline in cost was most obvious in the area of building and equipment insurance, ranging from \$11.32 per acre on farms with less than 40 acres of sugar beets to \$4.85 per acre on farms having 100 acres or more. A similar trend was also observed for utilities whose cost also declined with increasing acres of sugar beets. The range in utility cost was from \$13.37 per acre on farms seeding less than 40 acres to sugar beets to \$3.73 per acre on farms seeding 70-99 acres. For the

TABLE 13: SUMMARY OF CASH OVERHEAD COSTS BY SIZE OF SUGAR BEET OPERATION - 1982

	<u><40 Acres</u>	<u>40-69 Acres</u>	<u>70-99 Acres</u>	<u>100 Acres And Over</u>
Crop Insurance	0.57	0.69	0.16	1.23
Association Fees	2.18	2.26	2.29	2.13
Land Tax	4.23	3.13	4.05	2.77
Water Tax	10.98	7.82	9.35	10.05
Building & Equip. Ins.	11.32	9.39	8.48	4.85
Utilities	13.37	8.79	3.73	5.16
Miscellaneous Overhead	12.19	19.05	8.90	12.08
Interest On Oper. Capital	31.13	29.30	31.04	30.77
TOTAL CASH OVERHEAD	85.97	80.43	67.99	69.05

size class having 100 acres and more the average utility cost amounted to \$5.16 per acre.

Interest on operating capital was the highest on the smallest farms (less than 40 acres of sugar beets) at \$31.13 per acre. This relatively high cost is a direct result of these farms incurring high cash expenses in the production of sugar beets. Overall, the range in interest cost for sugar beet production was quite small ranging from \$29.30 per acre on farms with 40-69 acres to \$31.13 per acre on farms with less than 40 acres. The range in total farm overhead costs was from \$85.97 per acre for farms having less than 40 acres of sugar beets to \$67.99 per acre on farms with 70-99 acres. For those farms with 100 acres or more, their total farm overhead cost was \$69.05 per acre.

Non-Cash Production Costs By Size Of Operation

No economic analysis is complete without taking into account non-cash production costs (Table 14).

The costs that were considered under this heading were primarily that of operator's labour, machine interest and depreciation, building

TABLE 14: SUMMARY OF NON-CASH OVERHEAD COST BY SIZE OF SUGAR BEET
OPERATION - 1982

	<u><40 Acres</u>	<u>40-69 Acres</u>	<u>70-99 Acres</u>	<u>100 Acres And Over</u>
Operator's Labour	123.03	89.46	81.91	48.14
Machine Int. & Deprec'n	208.54	165.22	191.62	145.11
Building Int. & Deprec'n	45.51	39.35	28.77	25.53
Land Int. (7%)	<u>95.26</u>	<u>105.66</u>	<u>97.58</u>	<u>84.41</u>
TOTAL NON-CASH OVERHEAD	472.34	399.69	399.88	303.19

and equipment interest, and depreciation and land interest. As is evident from Table 14, the advantages associated with size of the sugar beet operation were most obvious in the areas of operator's labour and building and equipment (interest and depreciation). Both of these areas showed a steady decline in cost with increasing farm size. Such an observation is quite in order seeing that larger sugar beet operations are able to spread their fixed cost over a larger number of acres resulting in a lower cost per acre when compared to the smaller sugar beet operations.

Summary Of Costs And Returns By Size Of Operation

In 1982, total cost per acre declined significantly as the size of the sugar beet enterprise increased. This was to be expected as a result of the advantages associated with economies of scale, especially, in the areas of machine use, labour, and non-cash overhead. Based upon the results presented in this section some of the general conclusions that can be drawn are:

1. There was a definite yield difference among the four size classes analyzed. Average yield as 15.39 tonnes per acre for the two largest size groups (70-99 acres and 100 acres and over) as compared to 14.86 tonnes per acre reported for the two smallest size groups (<40 acres and 40-69 acres).

2. Due to economies of scale, larger sugar beet farms can produce sugar beets at considerably lower cost per acre (resulting in increasing net returns) when compared to smaller farms.
3. The breakeven yield required to cover cash cost on smaller farms growing less than 40 acres of sugar beets was 10.24 tonnes per acre. For the larger farms (100 acres or more) a somewhat lower yield of 10.19 tonnes per acre was adequate. In order to cover total production costs a much higher yield of 20.41 tonnes per acre was necessary for the smaller farms compared to 16.76 tonnes per acre required by the larger farms.
4. Total realized income for the 1982 sugar beet crop was estimated at \$46.27 per tonne, an amount which includes hauling allowance and sugar beet tops. The breakeven prices required to cover total production cost were \$65.08, \$55.95, \$55.52 and \$51.47 per tonne for the less than 40 acres, 40-69 acres, 70-99 acres, and 100 acres and over size categories, respectively.

SECTION IV

EFFECT OF LOCATION

In order to analyse the economics of sugar beet production by location within the sugar beet growing area of southern Alberta, the 50 records obtained were divided into three main areas, namely, Lethbridge, Taber and Vauxhall.

For the Lethbridge area a total of 15 sugar beet enterprises were analyzed. More specifically, the participants involved were from Coaldale, Lethbridge and Tempest. The Taber area included Taber, Bow Island and Barnwell and involved a total of 20 sugar beet enterprises. Included in the Vauxhall area were Picture Butte, Vauxhall and Turin from which a total of 15 sugar beet enterprises was studied.

Returns From Sugar Beet Production By Location - 1982

Everyone is aware that the returns from any given crop is directly related to its yield. Sugar beet is no different and exhibited quite a variation in returns as location where the crop grew changed. For the benefit of all, Table 15 attempts to show the associated yield, cost and return of the sugar beet crop for different locations.

As is evident from Table 15, sugar beet yields were the highest in the Lethbridge Area averaging 16.30 tonnes per acre while in the Vauxhall area it was the lowest at 14.02 tonnes per acre. Yield for the Taber area was more or less average at 14.88 tonnes per acre. This range in yield as observed among the three locations represented an actual dollar difference in returns of \$103.76 per acre.

Returns from the sale of sugar beet tops were also found to be quite varied among locations ranging from \$0.62 per acre in the Vauxhall area to \$10.55 per acre in Taber area. For those study participants from the Lethbridge area a total average return from the sale of sugar beet tops of \$6.88 per acre was observed.

Additional returns that were realized through the hauling of sugar beets also varied with location. This was to be expected as there exists a direct relationship between the hauling distance of the sugar beet tonnage to the Taber factory and the amount of hauling allowance received. Thus, one would expect that participants in the Taber area because of their close proximity to the Taber sugar beet factory would experience very low hauling allowances. Indeed this was so as these study participants received on the average the lowest hauling allowance averaging \$2.73 per acre. Study participants from the Lethbridge and Vauxhall areas experienced average hauling allowances of \$5.60 per acre and \$7.85 per acre, respectively.

TABLE 15: SUMMARY OF COSTS AND RETURNS FOR SUGAR BEET PRODUCTION BY
LOCATION - 1982

LOCATION	LETHBRIDGE AREA		TABER AREA		VAUXHALL AREA	
Acres On Farm	62.37		42.02		44.01	
Number Of Farms	15		20		15	
Yield (t/Ac)	16.30		14.88		14.02	
	- - - - - \$/Acre - - - - -					
RETURNS						
Sugar Beet Sales	741.81		677.19		638.05	
Sugar Beet Tops	6.88		10.55		0.62	
Hauling Allowance	5.60		2.73		7.85	
TOTAL RETURNS	754.29	46.27/t	690.47	46.40/t	646.52	46.11/t
CASH COSTS						
Labour (Hired)	15.91		13.92		13.45	
Contract Work	60.83		60.29		58.35	
Materials	148.16		119.26		131.81	
Machine	153.31		164.08		166.62	
Miscellaneous	81.77		113.82		106.06	
TOTAL CASH	459.98	28.22/t	471.37	31.68/t	475.29	33.90/t
NON-CASH COSTS						
Land	121.09		76.64		80.95	
Buildings	25.07		41.84		33.97	
Machinery	171.99		184.15		169.93	
Operator's Labour	68.70		92.78		85.14	
TOTAL NON-CASH	386.85	23.73/t	395.41	26.57	369.99	26.39
TOTAL COSTS	846.82	51.95	866.78	58.25	845.29	60.29
RETURN OVER CASH COSTS	294.31	18.06	219.10	14.72	171.23	12.21
RETURN TO MANAGEMENT	-92.53	-5.68	-176.31	-11.85	-198.77	-14.18
BREAKEVEN YIELD TO						
COVER CASH COSTS	9.94		8.52		10.31	
BREAKEVEN YIELD TO						
COVER ALL COSTS (t/Ac)	18.30		18.68		18.33	

Cash Production Costs By Location

A detailed breakdown of cash costs associated with sugar beet production among the three main sugar beet producing areas is shown in Table 16. Total cash costs were observed to be the highest in the Vauxhall area.

TABLE 16: A BREAKDOWN OF SUGAR BEET CASH COSTS BY LOCATION - 1982

<u>CASH COSTS</u>	<u>LETHBRIDGE AREA</u>	<u>TABER AREA</u>	<u>VAUXHALL AREA</u>
	- - - - - \$/Acre - - - - -		
Labour (hired)	15.91	13.92	12.45
Custom/Contract	60.83	60.29	58.35
Fertilizer	85.11	66.17	71.78
Seed	22.86	21.25	18.99
Chemicals	40.19	31.84	41.04
Machine Operations	153.31	164.08	166.62
Cash Rent/Crop Share	6.96	38.69	33.20
Crop Insurance	0.76	0.54	0.70
Association Fees	2.39	2.13	2.09
Land Tax	4.78	3.30	2.00
Water Tax	12.00	9.52	6.16
Bldg. & Equip. Ins.	7.09	8.67	8.97
Utilities	6.48	7.73	7.14
Miscellaneous	11.23	12.41	14.72
Int. On Oper. Capital	30.09	30.84	31.09
TOTAL	459.98 28.22/T	471.37 31.68/T	475.29 33.90/T

area at \$475.29 per acre, followed by Taber at \$471.37 and then by Lethbridge at \$459.98 per acre. These costs when expressed on a per tonne basis amounted to \$33.90, \$31.68 and \$28.22 for the three above mentioned areas, respectively.

Material inputs, namely seed, fertilizer and chemicals were the highest in the Lethbridge area at \$148.16 per acre, followed by Vauxhall

at \$131.81 and then by Taber at \$119.26 per acre. One of the main reasons for such high material costs for the Lethbridge area was due to poor weather conditions that prevailed during the growing season. To illustrate, a severe wind storm on May 25, 1982 coupled with hailstorms on July 1, 1982 and July 22, 1982 resulted in much crop damage in the Lethbridge area. As such, some re-planting had to be done thereby lending to a duplication of material input costs. Similar experiences were also indicative of the Vauxhall area but only to a lesser degree.

As in the 1981 study year, machine operating costs were found to be the highest for the Vauxhall area at \$166.62 per acre. This was followed by Taber at \$164.08 per acre and then by Lethbridge at \$153.31 per acre. Such high costs for the Vauxhall area can be attributed to the fact that most of the study participants from this area are very small in terms of total sugar beet acres planted. Secondly, for those Vauxhall growers who hauled their sugar beets to the Taber factory the additional machine operating costs (that is trucking) were only partially off-set by the hauling allowance received.

Cash rent/crop share costs for the Taber area were significantly high when compared to the two other locations. The implication of this being that a smaller portion of the cropped sugar beet acres were grown on owned land. Cash rent/crop share for the Taber area was \$38.69 per acre while in the Vauxhall area a total cost of \$33.20 per acre was reported. The lowest cost of \$6.96 per acre for cash rent/crop share in the Lethbridge area indicates that most of the sugar beet growers studied for this area grew their sugar beets on owned land.

It is worth mentioning that the high overhead cash cost for items such as insurance and utilities, as well as, the high interest charged on operating capital for the study participants in the Vauxhall area seems to be quite appropriate as most of the smaller sugar beet farms are located here. To illustrate, sixty per cent of the Vauxhall participants had fewer than 40 acres in sugar beet production. Land and water taxes were the highest at \$16.78 per acre in the Lethbridge area suggesting the existence of more productive land as is evident from the yield of 16.30 tonnes per acre.

Non-Cash Production Costs By Location

Components of total non-cash production costs for the three locations studied are shown in Table 17.

TABLE 17: SUMMARY OF NON-CASH PRODUCTION COSTS FOR SUGAR BEETS BY LOCATION - 1982

	<u>LETHBRIDGE AND AREA</u>	<u>TABER AND AREA</u>	<u>VAUXHALL AND AREA</u>
	- - - - - \$/Acre - - - - -		
Operator's Labour	68.70	92.78	85.14
Machinery Int. & Deprec'n	171.99	184.15	169.93
Bldg. Int. & Deprec'n	25.07	41.84	33.97
Land Interest	121.09	76.64	80.95
TOTAL NON-CASH COST	386.85	395.41	369.99

Consistent with the findings of the 1981 study year, higher labour costs were still being noted for the Taber and Vauxhall areas at \$92.78 per acre and \$85.14 per acre, respectively. For the Lethbridge area, this value was much lower at \$68.70 per acre. This observed reduction in labour cost for the Lethbridge area might suggest that because of the size of the sugar beet farms (which are predominantly large), the trend has shifted towards increased mechanization as a substitute for higher labour demands.

As for land costs, there existed a direct relationship between land ownership costs and the proportion of sugar beets grown on owned land. For example, as was shown in the cash cost section, the Lethbridge sugar beet growers had the lowest cash rent/crop share costs and therefore had the highest owned land cost of \$121.09 per acre. For the study participants from the Taber and Vauxhall areas, relatively lower land costs of \$76.64 per acre and \$80.95 per acre were observed implying that these sugar beet growers grew a greater proportion of their crop on rented land.

Machinery interest and depreciation costs ranged from \$169.93 per acre in the Vauxhall area to \$184.15 per acre for the Taber area, while the Lethbridge area reported a cost of \$171.99 per acre.

Summary Of Costs And Returns By Location

Findings from the 1982 sugar beet study by location are quite similar to those reported in the previous study year - 1981. An attempt has been made to highlight a few of the major findings and are as follows:

1. Study participants from the Vauxhall area experienced considerably higher cash costs of \$475.29 per acre in comparison to Taber and Lethbridge which reported cash costs of \$471.37 per acre and \$459.98 per acre, respectively.
2. Non-cash costs varied by less than \$3.00 per tonne among the Vauxhall, Lethbridge and Taber areas.
3. Returns among the three main sugar beet producing areas were quite similar and ranged from \$46.11 per tonne in the Vauxhall area to \$46.40 per tonne in the Taber area. Average returns for the Lethbridge area was reported at \$46.27 per tonne.
4. Total production costs ranged from \$51.95 per tonne in the Lethbridge area to \$60.29 per tonne in the Vauxhall area.
5. Study participants in the Vauxhall area were short \$14.18 per tonne of covering all of their production costs while in the Lethbridge and Taber areas it was less at \$5.68 per tonne and \$11.85 per tonne, respectively.
6. The breakeven yield, in tonnes per acre, required to cover total production costs for the Lethbridge, Taber and Vauxhall areas were 18.30, 18.68 and 18.33, respectively.

SECTION V

COMPARISON OF COSTS AND RETURNS FOR 1981-1982

Costs and returns data comparing the 1981 and 1982 study years are presented in Table 18. Most sugar beet growers would describe the 1982 season as a year of frustration as several factors can be identified which had adverse effects on production. Sugar beet yields averaged 15.18 tonnes per acre in 1982 which was 20.3 per cent less than the 19.05 tonnes per acre achieved in 1981. Sugar beet crops in 1982 were seriously affected by hail and rain storms, wind erosion, flea beetles and root maggots.

Although the price paid for sugar beets increased 5.4 per cent during the two year period, per acre returns declined by 15.7 per cent to \$702.64 per acre from \$833.54 per acre in 1981. The value of sugar beet tops continued to decline as the trend towards the use of the defoliator has increased, resulting in less aftermath being fed to livestock. Hauling allowance income increased in 1982 to \$5.22 per acre as compared to \$3.87 per acre in 1981 suggesting that more growers tend to haul their sugar beets directly to the Taber refinery. It may be assumed that with the use of larger trucks and the relatively smaller crop in 1982, growers were prepared to haul their beets a longer distance.

Cash costs in 1982 on a per acre basis declined by 6.1 per cent from 1981 levels mainly because of less machinery expenses that were associated with harvesting a smaller crop. Also, another main factor contributing to the lower machine operation cost in 1982 was that of less summerfallowing. Of the 50 fields of sugar beets analyzed in 1981, 13 were grown on summerfallow as compared to the one field that was grown in 1982. With the assumption that the benefits of summerfallowing are entirely utilized by the first crop, the entire cost of summerfallowing was charged against the sugar beet enterprise.

Second to machine operation costs were material costs at \$133.75 per acre, an increase of approximately 8.5 per cent from 1981. All material input costs were observed to have increased relative to the 1981 study

year. Other cash costs which were reported to have increased were the land and water taxes, and miscellaneous cash overhead.

The cost of hired wage labour and custom/contract work declined significantly in 1982 and can be attributed to the use of more chemicals and planting to stand thereby requiring less labour for thinning. With interest rates declining in 1982 relative to 1981, interest on operating capital declined by 25.6 per cent. As a larger portion of the sugar beet fields analyzed in 1982 were grown on owned land the cost of cash rent/-crop share also declined. Total cash costs in 1982 averaged \$468.06 per acre as compared to \$498.73 in 1981. However, taking into account the smaller crop in 1982, average cash costs per tonne increased in 1982 to \$30.83 per tonne from \$26.18 per tonne in 1981, an increase of 17.8 per cent.

Non-cash costs on a per acre basis in 1982 also decreased relative to 1981 but only marginally at 2.3 per cent. Operator's wage labour increased by 5.6 per cent as an internal substitution of operator labour for hired labour was observed. As a large portion of the studied acreage in 1982 was grown on owned land, opportunity interest costs on land increased by 14.6 per cent relative to 1981. Machinery ownership costs declined by \$20.18 per acre in 1982 as a direct result of less summerfallowing and to a lesser extent a lower yielding crop. Total non-cash costs in 1982 decreased to \$385.23 per acre from \$394.27 per acre in 1981. However, because of a lower yield in 1982, total production costs increased to \$56.21 per tonne as compared to \$46.88 per tonne in 1981.

In summary, the lower returns realized by growers in 1982 is not as a result of higher production costs as was the case in previous years but rather due to the reduced returns associated with the lower yield. The breakeven price required to cover all production costs 1982 was \$56.21 per tonne which compares to the average price actually paid to growers of \$45.51. The average sugar beet grower on study in 1982 had a return over cash costs of \$234.58 per acre which is a decline of 42 per cent in comparison to the \$334.81 per acre reported in 1981. Returns to management showed a drop in 1982 as growers were short \$150.64 per acre of covering all their costs in comparison to that of \$59.45 per acre in 1981.

TABLE 18: COMPARISON OF COSTS AND RETURNS FOR THE 1981-1982 STUDY YEARS

	1981 Group Average	1982 Group Average	PER CENT CHANGE 1982/81
RETURNS			
Average Yield (t/Ac)	19.05	15.18	79.7
	- - - - - \$ PER ACRE - - - - -		
Sugar Beet Sales	822.58	690.97	84.0
Sugar Beet Top Value	7.09	6.45	91.0
Hauling Allowance	3.87	5.22	134.8
TOTAL RETURNS	833.54	702.64	84.3
CASH COSTS			
Machine Operation	161.52	160.63	99.5
Seed	18.57	21.25	114.4
Fertilizer	73.05	74.96	102.6
Chemicals	31.70	37.55	118.5
Wage Labour	27.84	14.29	51.3
Custom/Contract Work	67.97	59.97	88.2
Cash Rent/Crop Share	36.89	25.01	67.8
Land/Water Taxes	11.33	13.07	115.4
Interest on Oper. Capital	41.18	30.62	74.4
Misc. Cash Overhead	28.67	30.71	107.1
TOTAL CASH COSTS	498.73	468.06	93.9
NON-CASH COSTS			
Land	82.76	94.88	114.6
Building Ownership	38.56	33.27	86.3
Machinery Ownership	195.80	175.62	89.7
Operator's Wage Labour	77.15	81.46	105.6
TOTAL NON-CASH COSTS	394.27	385.23	97.7
TOTAL PRODUCTION COSTS	892.99	853.28	95.6
RETURN OVER CASH COSTS	334.81	234.58	
RETURN TO MANAGEMENT	-59.45	-150.64	
BREAKEVEN PRICE TO COVER			
CASH COSTS (\$/Tonne)	26.18	30.83	
BREAKEVEN PRICE TO COVER			
ALL COSTS (\$/Tonne)	46.88	56.21	